Community Reinvestment Lending In a Changing Context:

Evidence of Interaction with FHA and Subprime Originations

Working Paper: January 2009

By
Jonathan Spader

Center for Community Capital
The University of North Carolina at Chapel Hill

Prepared with financial support from The Ford Foundation

Center *for* Community Capital
Research and analysis on the transformative power of capital

UNC
COLLEGE OF
ARTS & SCIENCES

Abstract
While a substantial and growing literature scrutinizes the subprime market, far less attention has been given to the contiguous development of community reinvestment lending by prime institutions. This article uses a unique demonstration program to examine the role of community reinvestment loans in meeting the credit needs of underserved borrowers. The analysis examines borrowers' substitution of community reinvestment loans for FHA and subprime mortgage products. In the years prior to the expansion of the subprime market, a small portion of community reinvestment loans are found to substitute for FHA originations. Conversely, a much larger substitution effect is found with respect to high-cost originations during the years of the subprime industry's growth.

Introduction

In the past decade, the dramatic rise and fall of the subprime mortgage industry fundamentally altered the scope of the mortgage market in the United States. The appearance and growth of subprime lenders increased both the volume of lending and the diversity of mortgage products available to consumers. A growing literature documents the nature of the resulting subprime industry, describing both the risk characteristics for lenders and the marketing practices used to attract consumers. However, less attention has been given to the interaction of the subprime market with existing market segments. Instead, discussion of the subprime market often treats subprime lending as an independent entity, assuming that the subprime industry acted only to increase access to credit at the outer margin and did not compete with prime lenders at the inner margin.

This essay examines the overlap and interaction of the prime, subprime, and FHA markets, exploring the extent to which these products act as substitutes. Specifically, it uses a unique demonstration program to examine the extent to which community reinvestment lending by prime lenders substitutes for subprime and FHA originations. The resulting analyses offer insight into the relative role of community reinvestment lending, particularly the overlap of the lending activities of prime and subprime lenders.

As early as 2000, Freddie Mac estimated that between 10 and 35 percent of subprime borrowers met GSE purchasing requirements for lower-cost loans. Fannie Mae put their estimate at 50 percent of borrowers in the subprime market (Fishbein and Bunce 2000). These estimates raise concerns about the about the misclassification of prime-quality borrowers into the subprime market. In doing so, they also highlight the lack of a clean boundary between the prime and subprime markets. Instead, the likelihood that a borrower originates a low-cost mortgage depends in part on the pathways through which potential borrowers learn about and apply for mortgage products, and not simply on the borrower's credit history and underwriting characteristics.

This overlap suggests a potentially changing role for the Community Reinvestment Act (CRA) in markets with risk-based pricing. Where CRA previously acted to extend access to mortgage credit to underserved borrowers and neighborhoods, this role may be modified in markets with risk-based pricing where CRA may instead act to create access to *low-cost* mortgage credit. In this way, the role of community reinvestment lending depends on the nature of the surrounding mortgage market. Unfortunately, very little research has directly examined the relative role of community reinvestment lending programs. In part, this gap in the empirical literature is due to the absence of clear standards for defining and identifying community reinvestment loans. Additionally, the explosive growth of the subprime market overshadowed community reinvestment lending in recent years. However, mounting foreclosures and dwindling originations in the subprime market may return attention to the role of community reinvestment lending in extending credit to underserved borrowers.

This article uses a unique demonstration program to shed light on the relative role of community reinvestment lending. Specifically, it examines the extent to which community reinvestment loans substitute for FHA and subprime originations. The

analysis suggests that in the years prior to the expansion of the subprime market, roughly one in four community reinvestment loans substituted for an FHA origination, with little to no substitution for subprime originations. Conversely, during the years of the subprime industry's growth, roughly two in three community reinvestment loans substituted for higher-cost loans. The standard errors attached to both estimates suggest that each must be interpreted as a rough approximation. Additionally, the estimates must be considered within the context of the individual demonstration program. However, these findings are suggestive about the dynamic role of community reinvestment lending in the changing context of the broader mortgage market.

The Development of Community Reinvestment Lending

The Community Reinvestment Act of 1977 (CRA) established an affirmative obligation for lenders to serve all neighborhoods in the communities in which branches are located. This legislation exhorted lenders to create access to mortgage credit in underserved neighborhoods, but maintained that such lending must remain consistent with safe and sound operations. In this way, CRA directly instructs lenders to meet the credit needs of underserved borrowers, but recognizes that the extent of such lending will depend upon the context of individual lenders' operations (Barr 2005). Consistent with this approach, the CRA exam empowers the examiner to exercise discretion when considering the lending activities of a single lender. Amendments in 1989, 1995, and 1999 acted to strengthen the regulatory tools available to CRA examiners and the public, but retained this basic approach to CRA compliance (Litan et.al. 2001).

Under the revised CRA, regulated lenders are examined every three to four years and required to document evidence of service, investment, and lending activities within their assessment areas. While examiners review and evaluate each lender's efforts with respect to each of these criteria, the lending goals do not impose specific requirements on the volume or proportion of lending activities that must target underserved borrowers or neighborhoods. Instead, the examiner is instructed to evaluate an institution's lending activities within the context of the assessment area's needs.

This discretionary approach to CRA compliance relies extensively on the strength of CRA enforcement by regulators. In practice, nearly all lenders have received high marks, and regulators have only rarely applied the penalties associated with poor performance (Barr 2005; Apgar and Duda 2003). Instead, the strength of CRA enforcement has also depended upon the involvement of third-party entities. Local community organizations and advocates play active roles in both identifying poorly performing lenders and in pressuring regulators to apply CRA evaluation scores as a criterion for bank mergers (Immergluck 2004). These groups have effectively used media campaigns and other strategies to leverage CRA-related performance into both regulatory actions and directly-negotiated CRA agreements in which lenders commit to defined future lending activities (Bostic and Robinson 2003, 2005; Schwartz 1998a, 1998b).

This regulatory structure guided prime lenders' approach to meeting the credit needs of underserved neighborhoods during the period of the subprime industry's growth. Beginning in the late 1980s, technological advances in mortgage underwriting

technologies dramatically improved lenders' abilities to measure the risk associated with alternative mortgage characteristics. These advances led directly to the development of credit scoring and risk-based pricing, and are commonly associated with the rapid development of the subprime mortgage industry. Among prime lenders, the improvements in lenders' abilities to observe and quantify risk led to experimentation with flexible underwriting and the development of targeted lending programs (Quercia, McCarthy, and Wachter 2003; Calem and Wachter 1999). To qualify for prime credit, lenders traditionally required that applicants make a 20 percent down payment, have a credit score of 660 or higher, have a payment-to-income ratio of no more than 28 percent, have a debt-to-income ratio of no greater than 36 percent, and retain savings of at least two monthly mortgage payments in reserve after closing.

Beginning in the mid-1990s, improvements in lenders' abilities to measure risk allowed prime lenders to experiment with the relaxation of individual underwriting requirements. For instance, many lenders developed products with reduced down payment requirements, initially allowing loan-to-value ratios of up to 97 percent and eventually allowing loan-to-value ratios of 100 percent or more. Similarly, lenders sought to reduce credit score, payment-to-income, and reserve requirements. By 2000, many lenders offered products that relaxed one or more of the traditional underwriting criteria, often using these products as part of their strategy for CRA compliance. While these non-traditional mortgage characteristics increased access to mortgage credit for many households, they also created liquidity constraints for many of the lenders originating these loans. Rather than treating the mortgages as conforming loans and selling them to Fannie Mae and Freddie Mac, lenders generally were forced to hold the loans in portfolio (Quercia et.al. 2002).

By contrast, subprime lenders circumvented the traditional secondary market, creating a more direct route to Wall Street. Where conventional loans are typically purchased and securitized by the GSEs, the AA and AAA ratings given to most mortgage-backed securities enticed multiple Wall Street investment banks to purchase and securitize subprime mortgages directly. The result was a flood of mortgage credit into low-income and minority neighborhoods (Ding et.al. 2008; Calem, Gillen, and Wachter 2004; Calem, Hershaff, and Wachter 2004), the same areas targeted by community reinvestment lending programs.

Little is known either about the role of community reinvestment lending in meeting the credit needs of underserved communities or about the interaction of community reinvestment lending with the subprime market. Reviews of the Community Reinvestment Act generally agree that CRA induces banks to increase their lending activity in underserved neighborhoods (Apgar and Duda 2003; Barr 2005; Haag 2000). However, less agreement exists over the extent to which such lending succeeds in meeting the credit needs of underserved communities.[1]

[1] Disagreement persists over the nature and extent of the underlying market failure (Gunther, Klemme, and Robinson 1999).

The lack of empirical research on the community reinvestment market results at least in part from an absence of empirical data. One of the unfortunate consequences of CRA's discretionary examination structure is that no clear standards exist for defining and identifying CRA-related lending activities. Additionally, lenders' treatment of community reinvestment portfolios is often determined by unobservable decisions related to the institution's strategy for CRA compliance. The analysis performed by the Joint Center for Housing Studies (2002) offers the most detailed examination of CRA lending to date. This study convincingly identifies the impact of CRA on observed lending patterns, but also illustrates the difficulties inherent in identifying this market segment.

The unfortunate result of these obstacles to empirical analysis has been that little evidence documents the potential role of community reinvestment lending in the broader mortgage market. In particular, no studies to date have directly examined the overlap and interaction of community reinvestment lending with the subprime and FHA markets. Instead, much of the available evidence with respect to the Community Reinvestment Act focuses on the impact of lending agreements, negotiated between community organizations and individual lenders. Evaluations of the impact of these agreements generally suggest that the presence of a CRA agreement is associated with increased lending to underserved borrowers (Schwartz 1998a; Schwartz 1998b), although it is less clear whether these increases are sustained over the long-term (Bostic and Robinson 2005; Bostic and Robinson 2003).[2]

Community Reinvestment Lending and Mortgage Choice

Competition between the FHA and conventional mortgage segments has been studied extensively in recent past.[3] Hendershott, LaFayette, and Haurin (1997) and Pennington-Cross and Nichols (2000) both examine the choice between FHA and conventional loans, and both studies reinforce the importance of financial factors in sorting borrowers between segments. Borrowers are shown to consider down payment constraints, monthly payment constraints, and the cost of mortgage insurance in making their decisions. Pennington-Cross and Nichols (2000) additionally show that credit history moderates product selection, with a higher credit score increasing the likelihood of choosing a conventional mortgage.

Several recent studies update this literature to include subprime product options, similarly documenting the importance of financial factors and credit history. Pennington-Cross, Yezer, and Nichols (2000) analyze the choice between prime, subprime, and FHA products for a sample of mortgages originated in 1996. Not surprisingly, the results suggest that credit history and other risk characteristics play a strong role in determining the use of subprime mortgages. However, the analysis offers little evidence that wealth and down payment constraints channel borrowers towards subprime mortgages during the

[2] Existing evidence offers mixed results with respect to whether the impact of a CRA agreement persists after the agreement expires.

[3] This article focuses on mortgage choice in a market with risk-based pricing. It therefore seeks to review those analyses that include subprime mortgage options, and is therefore brief in addressing the FHA-conventional choice. Readers seeking a more complete discussion should refer to LaCour-Little (2007) and to Pennington-Cross and Nichols (2000).

period of study. Courchane, Surette, and Zorn (2004) similarly examine the classification of borrowers into the prime and subprime market segments. Their analysis reinforces the strong relationship between a poor credit history and the use of a subprime product, but also highlights that demographic events such as divorce and unemployment also predict the use of subprime credit.

Lastly, LaCour-Little (2007) isolates a sample of low- and moderate-income households to examine the choice between conventional conforming, FHA, subprime, and 'specially targeted' mortgage products. The latter 'specially targeted mortgage program' reflects a partnership between a national bank and the GSEs. While the description of this program is not specific regarding the CRA status of the originated loans, the targeted focus of the program suggests that this lending program may be part of the bank's community reinvestment lending portfolio. Across products, the results are consistent with the previous studies,[4] offering a hierarchy of preferences. Borrowers choose lower-cost products to the extent that their credit history and underwriting characteristics meet the necessary qualification requirements. As a result, the targeted program, which reduces the down payment requirement on lower-cost products, is a preferred option among many low- and moderate-income borrowers.

This competitive advantage of lower-cost products is a natural result of rational behavior, as borrowers seek to minimize cost conditional on the set of available mortgage options. As such, it can be expected to define borrower behavior at the margin of the prime and subprime markets. For instance, An and Bostic (2008b) examine the impact of GSE purchasing requirements on the extent and geographic distribution of subprime lending activities under the assumption that expanded access to conventional, conforming mortgages will attract borrowers that otherwise might select subprime loans. The results confirm this expectation, showing that expanded purchasing under the GSE's affordable lending goals expands the scope of prime credit. An and Bostic (2008b) shows a similar effect of GSE purchases on FHA loans, documenting substitution of prime mortgages for FHA mortgages among the lowest risk set of potential FHA borrowers.[5]

Where the first set of mortgage choice studies directly identify the predictors of product choice and make inferences regarding product substitution, this second set of studies examines the impact of changes in the GSE's affordable lending goals on the flow of lower-cost mortgage credit into neighborhoods. The current study applies the latter approach to the community reinvestment market, using a unique secondary market demonstration program. Specifically, the analyses seek to identify the substitution of community reinvestment loans for FHA and subprime mortgage products.

[4] The analysis also offers new evidence that a need to close quickly and/or a desire for reduced documentation requirements related to self-employment also predict the use of subprime products.

[5] This study helps to explain the apparent paradox between evidence that the affordable lending goals increased purchasing activities (Bunce 2002; Temkin et.al. 2001), but had limited impacts on housing outcomes (An et.al. 2007; Bostic and Gabriel 2006). The analysis shows that the impact on FHA lending acts to moderate the direct effect of GSE purchases on housing outcomes.

The Community Advantage Home Mortgage Secondary Market Program (CAP)
The Community Advantage Program (CAP) is a secondary market program developed out of a partnership between the Ford Foundation, Fannie Mae, and Self-Help, a leading community development financial institution (CDFI) located in Durham, North Carolina. Under CAP, Self-Help purchases fixed-rate, purchase mortgages with loan features that prevent them from being readily sold in the secondary market. Consistent with the development of community reinvestment mortgage products, many of the loans allow high debt-to-income levels, limited down payments, waiver of private mortgage insurance, and/or non-traditional credit history. While lenders initially experimented with the relaxation of only one qualifying requirement, loans in the CAP portfolio are allowed to deviate from multiple standards.

The resulting CAP portfolio reflects the purchasing activities Self-Help, and thus is not specifically designed to create a representative cross-section of the community reinvestment mortgage market. In some cases, Self-Help purchased a portfolio of seasoned loans held in a lenders' portfolio, with a commitment from the lender to reinvest the resulting capital in similar lending activities. In others, lenders developed products intended for sale to Self Help, selling the products on a flow basis as new loans were originated. In this way, the CAP portfolio includes both 'portfolio' purchases of seasoned loans and 'flow' purchases of recent originations.

In all cases, participating lenders originate and service the loans under contract with Self-Help, while Self-Help securitizes and sells the loans while retaining recourse (effectively creating a traditional outlet for otherwise illiquid loans). While no clear standards exist for defining community reinvestment mortgages, the CAP program instituted purchasing guidelines to delineate its target lending activities. To qualify for purchase under CAP, the borrower must meet one of three criteria: (1) have income under 80 percent of the area median income (AMI) for the metropolitan area; (2) be a minority with income below 115 percent of AMI; (3) or purchase a home in a high-minority (>30%) or low-income (<80% AMI) census tract and have an income below 115 percent AMI.

This mix of income- and location-based requirements gives the participating lenders some flexibility in developing programs to meet the needs of their specific markets. However, the use of these requirements also imposes strict selection rules that do not directly align with the set of loans targeted under CRA.[6] Analysis of this portfolio is therefore reflective of a broad array of community reinvestment lending activities, but must be interpreted within the context of the CAP program. With that caveat in mind, the resulting portfolio provides rich information on over 35,000 community reinvestment mortgages originated by 32 lenders in 42 states between 1998 and 2006.

Methodology and Data
The analysis relies both on loan origination data specific to the CAP program and on data reported pursuant to the Home Mortgage Disclosure Act (HMDA) for the years 1997-2006. The HMDA data is limited to the set of first-lien home purchase mortgage

[6] The second and third purchasing criteria broaden CAP's coverage beyond traditional CRA loans, allowing moderate-income borrowers who are minority and/or live in a low-income or high minority tract.

originations in order to mirror the set of mortgages in the CAP dataset. The set of CAP and HMDA loans are aggregated at the census tract level and merged, so that the resulting dataset includes one observation for each census tract in each year. Using this data, the empirical analyses identify the extent to which CAP mortgages substitute for FHA and subprime mortgage products. Because CAP lending accounts for a very small proportion of overall lending, variation in the presence of a CAP loan across years within individual census tracts can be used to identify the impact of a CAP origination on the number and share of FHA and subprime mortgages.

The formal model is a tract-level fixed effects model that can be written:[7]

(1) $Y_{it} = C_{it}g + X_{it}b + R_t + T_i + e_{it}$

where i indexes census tracts and t indexes the year of origination. In this model, C_{it} is the number of CAP loans in census tract i in year t and X_{it} is the set of covariates. The model also includes a set of year indicator variables, R_t, and a set of census tract fixed effects, T_i. Estimation of equation (1) therefore identifies the change in outcome measure Y_{it} that is associated with the presence of a CAP loan. Put another way, the models isolate variation within census tracts across time, identifying the association of the presence of a CAP loan in a given year with any deviation of the outcome measure from the trend observed across all census tracts.

Equation (1) is estimated with respect to the share and number of prime, subprime, and FHA loans. First, analysis with respect to the share of FHA and subprime originations in the tract examines the impact of CAP lending on the relative volume of each of these types of mortgage credit. Second, equation (1) is also estimated with respect to the individual components of the share measures, specifically the number of prime, FHA, and subprime mortgages originated in the tract. Where origination of a CAP mortgage may negatively impact the share measures by increasing the total number of originations in the denominator, this second set of measures isolates the impact of CAP in substituting for FHA and subprime mortgage use. The second specification of the outcome measures—the number of mortgages originated in the tract—is therefore the preferred form, and used in the empirical analyses.

In each of these analyses, FHA loans are identified directly in HMDA, while subprime loans are identified using the list of subprime lenders maintained by HUD. As a result, any impact of CAP on the measure of subprime loans cannot be interpreted as an effect on the number of higher-cost loans per se, but rather on the number of loans originated by lenders specializing in high-cost lending. Unfortunately, direct identification of high-cost loans is not possible in HMDA data until 2004. As a partial test of the robustness of the HUD measure, estimation of equation (1) is repeated for the years 2004-2006.

Identification of the model defined by equation (1) requires that variation in the presence of a CAP loan be exogenously determined. Of particular concern, the appearance of a CAP loan in a given year must be independent of local economic factors that also

[7] Ideally, this model might also be estimated using loan-level data. However, the sheer size of such a dataset is prohibitive. For the period from 1998 to 2006, such an analysis would exceed 30 million observations and is therefore not possible with available computing resources.

determine the outcome measure of interest. While shared economic factors are likely to determine the local trends in the number of prime and subprime originations across time, this may not be the case with CAP originations. Variation in the CAP measure appears disproportionately as the presence or absence of a CAP loan in a given year, which is determined by the joint occurrence of the presence of a qualified applicant in the tract and that applicant's choice of a participating CAP lender. Both occurrences are likely to be at least partially random, and therefore the analyses seek to isolate this random variation conditional on the set of included covariates.

Because the specification used to estimate equation (1) attempts to exploit the natural variation in the appearance of a CAP loan in a given year, it includes minimal additional covariates. Given the identification strategy, the primary concern is that local housing market factors and growth in mortgage originations differ systematically across localities. To directly address this concern, the analyses include the number of originations in each alternative market segment. Additional analyses also explored the inclusion of a MSA-level measure of housing price appreciation.[8] However, such a measure may be endogenous to the number of loan originations and is therefore omitted. The empirical results are similar when this appreciation measure is omitted vs. included.[9]

Empirical Analysis

The CAP portfolio of purchased loans includes 35,925 mortgages originated between 1998 and 2006, each of which is structured as a 30-year, fixed-rate product. Table 1 shows the characteristics of these loans for the set of 31,472 mortgages with complete information on borrower and loan characteristics.[10] These characteristics confirm the targeted nature of community reinvestment lending.

[INSERT TABLE 1 ROUGHLY HERE]

The median household income among CAP households in the year of origination is $33,645, which amounted to an average of 62 percent of area median income. Recalling the purchasing requirements applied to CAP loans, the income figures shown in Table 1 suggest that a large majority of CAP mortgages qualify under the first option—borrower income falls below 80 percent of the area median income. Nearly 90 percent of CAP households have incomes below this threshold. Of the remainder, an additional 5 percent qualify under the second option—a minority borrower with income below 115 percent of area median income—and the remaining 5 percent qualify under the third option—a high-minority or low-income tract with borrower income below 115 percent of area median income.

[8] The annual appreciation rate is calculated from the MSA index reported by OFHEO.

[9] The additional HMDA characteristics are commonly used to construct additional covariates in other analyses. However, because CAP loans are not identifiable in HMDA data, the inclusion of such variables biases the estimate with respect to CAP. For instance, a CAP loan appears both as a prime loan and as a lower-income loan. Any included income counts would therefore identify CAP loans in the same way as the CAP variable of interest, diluting its effect. For this reason, such variables are not included.

[10] While the loan characteristics are summarized for the sub-sample with complete information, the empirical analyses are performed with respect to the full sample of 35,925 borrowers, as loans with missing data on the characteristics in Table 1 cannot be identified and excluded in HMDA data.

These borrower characteristics are supplemented with the set of loan characteristics, which document the nature and pricing of the community reinvestment mortgage products. CAP mortgages averaged $90,252 at origination and carried interest rates that averaged 7.2%. Figure 1 plots the path of originated interest rates by quarter, comparing these rates to the mean interest rates on fixed-rate (FRM) and adjustable-rate (ARM) mortgages reported by Freddie Mac's Primary Mortgage Market Survey (PMMS).[11] In each quarter, the mean interest rate for CAP mortgages hovers roughly 50 to 100 basis points above the average rate reported by PMMS for the prime market. This difference reflects the credit enhancement applied to CAP interest rates.[12] Because CAP loans do not require private mortgage insurance,[13] the rates shown in Table 2 imply that the pricing of CAP mortgages roughly corresponds to that for prime loans.

[INSERT FIGURE 1 ROUGHLY HERE]

The remaining loan characteristics in Table 1 document the use of flexible underwriting in the origination of CAP mortgages. First, the mean front-end and back-end ratios on CAP mortgages are .28 and .37, respectively, which near the traditional standards of .28 and .36. However, the mean values conceal variation in the distribution of these variables, as 46 percent of CAP mortgages carry front-end ratios that exceed .28 and 56 percent carry back-end ratios that exceed .36. Second, Table 1 directly presents the distribution of loan-to-value ratios and credit scores across the portfolio of CAP loans. Eighty percent of CAP mortgages carried loan-to-value ratios of 90 or higher, with 56 percent exceeding 97. Similarly, 70 percent of CAP mortgages carried credit scores below 720, with 37 percent below 660.

The set of CAP loans is aggregated at the census tract level for each year and merged to tract-level HMDA data. The resulting dataset contains one observation per census tract for each year between 1998 and 2006. Any census tract whose boundaries were redefined for the 2000 Census are removed from the analysis, as a consistent tract definition cannot be established for the analysis period. Census tracts that do not have at least one observed mortgage per year in HMDA are also eliminated. Of the 63,213 tracts with an observed mortgage in 1997 and the 67,739 tracts with an observed mortgage in 2006, 49,445 tracts are consistently observed across years.[14]

Table 2 separates this sample into tracts that contain at least one CAP origination and tracts without a CAP origination, comparing demographic characteristics using data from the 2000 Census. Comparison of these characteristics across CAP and non-CAP tracts

[11] See Freddie Mac's Primary Mortgage Market Survey [http://www.freddiemac.com/dlink/html/PMMS/display/PMMSOutputYr.jsp?year=2008]

[12] CAP loans generally carried a 75 basis point credit enhancement.

[13] The interest rates reported for the prime market by PMMS exclude borrowers' mortgage insurance payments.

[14] Because tract definitions are generally redrawn in response to population growth, the elimination of such tracts is likely to disproportionately remove fast-growing areas. While this reflects non-random elimination of sample observations, the impact is likely minimized by the nature of the analysis, which focuses on variation across time within tracts.

reflects the targeted nature of CAP lending, but also yields few systematic differences. CAP loans tend to be located in tracts with more residents, lower incomes, and lower median home values. However, CAP tracts, on average, also have higher homeownership rates, lower poverty rates, and lower unemployment rates than other tracts. These differences may reflect the presence of CAP lending in lower-income neighborhoods, but do not strongly suggest that CAP tracts systematically differ from non-CAP tracts.

[INSERT TABLE 2 ROUGHLY HERE]

The empirical analysis focuses on the impact of a CAP origination on the distribution of lending across time within the set of CAP tracts. Figure 2 displays the mean number of prime, FHA, and subprime loans originated in each year. Subprime loans reflect loans originated by lenders identified on HUD's subprime lender list, FHA loans are identified directly by HMDA data, and prime loans are defined as the remaining set of conventional loans originated by non-subprime lenders. The trend lines shown in Figure 2 show stable proportions of each type of lending between 1998 and 2001, after which prime and subprime lending dramatically increase. While the magnitude of the increase appears larger for prime lending, the increase in the subprime market multiplied its market share during this period. Both increases are at least partially offset by the decrease in FHA lending after 2001.

[INSERT FIGURE 2 ROUGHLY HERE]

The presence of CAP originations across years differs substantively from the patterns for prime, FHA, and subprime loans. Figure 3 shows the distribution of CAP originations across time, plotting the number of originations in each month. While there is substantial variation by month, the largest number of CAP mortgages were originated in the early and middle years of this period, with originations tapering off after 2003.

[INSERT FIGURE 3 ROUGHLY HERE]

The measure of CAP lending is defined at the tract level as the number of CAP originations in the tract.[15] Of the 69,219 observations (7,691 tracts x 9 years), only 14,653 observations (21%) have an observed CAP loan. While a few tracts exhibit multiple originations in several consecutive years,[16] the typical tract contains two to three years with an observed origination. Furthermore, when a positive value is observed, the typical number of originations is one. Seventy-two percent of the observed values are one and 88 percent of the observed values are one or two. These characteristics of the

[15] The measure of CAP lending can also be defined as whether at least one CAP origination is observed. The results when this form of the CAP variable is used are qualitatively similar, although the magnitude of coefficients is larger (as should be expected). The number of CAP originations is used in the results presented, as it allows for direct interpretation of the coefficients.

[16] As a robustness check, all analyses are repeated when the sample excludes observations with multiple observed CAP loans in a single year. The results are robust to the inclusion of these tracts.

CAP loan variable create suitable conditions for the analysis outlined in the methodology section.

Table 3 presents the first set of analyses with respect to the impact of CAP lending on the presence of prime, subprime, and FHA lending. The first two models show the effect of a CAP loan on the subprime lending share (FHA lending share), which is operationalized as the ratio of the number of subprime loans (the number of FHA loans) to the total number of loans originated in the tract. The latter three columns then examine the impact of a CAP loan on the individual components of these measures (e.g. the number of prime, subprime, and FHA loans originated in the tract).

[INSERT TABLE 3 ROUGHLY HERE]

The immediate finding from Table 3 is that the origination of a CAP loan is associated with a decrease in both the subprime share and the FHA share. However, this finding is complicated by the analysis with respect to each type of lending. In particular, the presence of a CAP loan is associated with a one-to-one increase in the number of prime loans. This outcome first corroborates the proposition that the CAP variable identifies the impact of a CAP origination and not unobserved economic factors, as this estimate appears to identify the presence of CAP originations among prime loans in HMDA data. Second, it undermines the use of the subprime and FHA share variables as outcome measures, as the negative estimates may be created entirely by association of a CAP origination with the number of originations in the denominator of the loan share measures.

As a result, the estimates with respect to the number of subprime and FHA originations are used to evaluate substitution across mortgage product types. For the full study period, the presence of a CAP loan is found to be negatively associated with the number of subprime originations, but is not associated with the number of FHA originations. While the estimated coefficient with respect to the number of subprime originations is relatively small, it implies that some substitution between community reinvestment and subprime mortgages exists. The estimate implies that roughly 15 percent of CAP mortgages substitute for a subprime origination.

Before examining this finding in greater detail, the covariate estimates also merit discussion. The number of prime originations is positively associated with the origination of subprime and FHA credit, while the number of subprime and FHA originations are negatively associated with one another. While these estimates are suggestive about the interactions of these market segments, the variation in the underlying variables likely also reflects the shared influence of local market factors. As a result, interpretation of the estimated associations must be performed with care.

Table 4 repeats this analysis for the period from 1998 to 2001 and for the period 2002 to 2006. Given the marked changes in the mortgage market shown in Figure 2, this analysis examines whether CAP's impact on each market segment differed under alternative market conditions. The estimates shown in Table 4 corroborate the importance of

distinguishing between time periods. In the earlier years (1998-2001), prior to the surge in subprime lending, the presence of a CAP loan again carries a one-to-one association with the number of prime loans, but has little effect on the number of subprime originations. Instead, a CAP origination carries a small substitution effect with respect to the number of FHA loans. The latter estimate implies that roughly one in four CAP loans substitutes for the presence of an FHA loan during this period.

[INSERT TABLE 4 ROUGHLY HERE]

In contrast, CAP lending appears to primarily substitute for subprime lending during the later period of subprime industry growth (2002-2006). The presence of a CAP loan during this period is strongly associated with a reduction in the number of subprime loans originated in a tract. The estimates imply that roughly 42 percent of CAP loans substituted for loans originated by subprime lenders. However, the estimates shown in the second panel of Table 4 also show a much weaker relationship between the presence of a CAP loan and the number of originated prime loans, raising questions about the identification of the CAP variable during this period. Where each of the previous analyses showed a one-to-one increase in the number of prime loans, the estimate for 2002-2006 is .69 and carries a smaller t-statistic.

One possible explanation for the weaker identification of the CAP variable in the second panel is that the definition of subprime lending on the basis of the originating lender may become less useful over time. As prime lenders moved into the subprime market, the distinction between prime and subprime lenders increasingly blurred. As a result, CAP borrowers may be substituting CAP products for higher-cost products offered by prime lenders.

The findings in the second panel of Table 4 are also tempered by the relationship between the presence of a CAP loan and the number of FHA originations in the tract. Where the presence of a CAP loan is found to substitute for FHA lending in the previous period, the estimate in Table 4 implies a positive association of CAP and FHA lending. The estimate is small and carries a weakly significant t-statistic. However, this result is inconsistent with a priori expectations about the impact of CAP lending and the specification of the estimated model.

In order to verify the estimated effects reported in the second panel of Table 4, the estimated models are replicated using an alternative definition of subprime lending. Where the previous estimations examine the impact of a CAP origination on the number of loans originated by prime and subprime lenders, HMDA data directly identifies high-cost loans beginning in 2004. This latter definition is likely preferable, as the line between prime and subprime lenders increasingly blurred over the course of the study period.[17]

[17] As the subprime industry grew, the array of loan options offered by subprime and prime lenders began to overlap, with prime lenders competing for higher-cost loans.

Table 5 reports the results of the analyses with respect to high-cost loan originations. The estimated coefficients ease concerns over the valid identification of the CAP variable and corroborate the basic results shown in the second panel of Table 4. First, the presence of a CAP loan carries a one-to-one impact on the number of originated prime loans, suggesting that the classification of subprime lending using the measure of high-cost lending may be preferable for the latter time period. The presence of a CAP loan is also no longer significantly associated with the origination of FHA loans, relieving the previous concerns over model specification. Lastly, the presence of a CAP loan strongly impacts the origination of higher-cost loans during this period. The estimated coefficient suggests that nearly 71 percent of CAP borrowers would have received subprime loans in absence of the CAP program. While this coefficient should be considered a rough estimate (the standard deviation is .22), it implies that the community reinvestment loans originated through CAP may have created access to low-cost mortgage credit for a majority of CAP households.

When the analyses presented in this section are considered together, they offer interesting insight into the role of community reinvestment lending both prior to and during the period of subprime market growth. During the period prior to the expansion of the subprime market, CAP originations appear to have substituted for FHA credit in a minority of cases and had little to no effect on subprime originations. Given that the impact on FHA originations applies to only one in four CAP loans, the CAP program likely expanded access to credit for many households during this period. In contrast, the dramatic growth of the subprime market after 2002 appears to have altered to the role of the community reinvestment market. Rather than creating new access to credit, a majority of CAP loans appear to have substituted for higher-cost subprime originations.

Discussion and Conclusions

This article uses a unique demonstration program to examine the role of community reinvestment loans in meeting the credit needs of underserved borrowers between 1998 and 2006. Where substantial research documents the development of the subprime industry (and the decline in FHA lending) during this period, less attention has been given to the development of community reinvestment lending by prime lenders. In large part, this disparity reflects the dramatic growth of the subprime industry, which outpaced the development of the community reinvestment market. However, in the wake of the subprime market's collapse, community reinvestment lending may provide a primary means for underserved borrowers to access purchase mortgage credit. The relatively stable performance of these loans also suggests that this market might provide a useful model for affordable mortgage finance in the coming years (Ding et.al. 2008).[18]

The analysis first documents the changing role of community reinvestment lending during the period of subprime market growth. Prior to the development of subprime lending, roughly one quarter of community reinvestment originations appear to substitute for FHA originations with little to no substitution for subprime lending. Given the extensive coverage of HMDA data, it is likely that the majority of community

[18] See also Calem and Wachter (1999) for an examination of the loan performance of a community reinvestment lending program in the early years of this market.

reinvestment lending during this period reflected new lending. This image of community reinvestment lending reverses after 2002, as dramatic growth in the subprime industry begins. Analysis with respect to this later period suggests that community reinvestment lending increasingly supplanted subprime originations, and that the impact on FHA lending diminished. This effect is particularly apparent with respect to high-cost loans, which first appear in HMDA data with the 2004 wave. For the period 2004-2006, the estimates imply that more than two in three community reinvestment originations substituted for a higher-cost mortgage product.

When these estimates are considered within the context of the broader mortgage market, they reflect a changing role for community reinvestment lending. Where community reinvestment loans appear to create access to credit prior to the boom in subprime lending, they appear to create access to low-cost credit in the later period. This shift mirrors the policy discussions surrounding the growth of the subprime market, as concerns shifted from fair access to credit towards access to fairly priced credit. While the analysis does not extend through the collapse of the subprime market, the sharp declines in higher-cost originations and the return of FHA lending suggest that community reinvestment lending may have returned to its pre-2001 role.

Bibliography

An, Xudong and Raphael W. Bostic. "GSE Activity, FHA Feedback, and Implications for the Efficacy of the Affordable Housing Goals." *Journal of Real Estate Finance and Economics* 36 no.2 (2008a): 207-231.

An, Xudong and Raphael W. Bostic. "Policy Incentives and the Extension of Mortgage Credit: Increasing Market Discipline for Subprime Lending." Social Science Research Network Working Paper, April 2008b.

An, Xudong, Raphael W. Bostic, Yongheng Deng, and Stuart A. Gabriel. "GSE Loan Purchases, the FHA, and Housing Outcomes in Targeted, Low-Income Neighborhoods." *Brookings-Wharton Papers on Urban Affairs* (2007): 205-256.

Apgar, William C. and Mark Duda. "The Twenty-Fifth Anniversary of the Community Reinvestment Act: Past Accomplishments and Future Regulatory Challenges." *FRBNY Economic Policy Review* (June 2003): 169-191.

Barr, Michael S. "Credit Where it Counts: The Community Reinvestment Act and its Critics." *New York University Law Review* 80 (2005): 513-652.

Bostic, Raphael W. and Stuart A. Gabriel. "Do the GSEs Matter to Low-Income Housing Markets? An Assessment of the Effects of GSE Loan Purchase Goals on California Housing Outcomes." *Journal of Urban Economics* 59 (2006): 458-475.

Bostic, Raphael W. and Breck L. Robinson. "Do CRA Agreements Influence Lending Patterns?" *Real Estate Economics* 31 no.1 (2003): 23-51.

Bostic, Raphael W. and Breck L. Robinson. "What Makes Community Reinvestment Act Agreements Work? A Study of Lender Responses." *Housing Policy Debate* 16 no.3/4 (2005): 513-545

Bunce, Harold L. "The GSEs' Funding of Affordable Loans: A 2000 Update." U.S. Department of Housing and Urban Development, Housing Finance Working Paper Series, HF-013.

Calem, Paul S. and Susan M. Wachter. "Community Reinvestment Agreements and Credit Risk: Evidence from an Affordable Home Loan Program." *Real Estate Economics* 27 no.1 (1999): 105-134.

Calem, Paul S., Kevin Gillen, and Susan Wachter. "The Neighborhood Distribution of Subprime Mortgage Lending." *Journal of Real Estate Finance and Economics* 29 no.4 (2004): 393-410.

Calem, Paul S. Jonathan E. Herschaff, and Susan M. Wachter. "Neighborhood Patterns of Subprime Lending: Evidence from Disparate Cities." *Housing Policy Debate* 15 no.3 (2004): 603-622.

Courchane, Marsha J., Brian J. Surette, and Peter M. Zorn. "Subprime Borrowers: Mortgage Transitions and Outcomes." *Journal of Real Estate Finance and Economics* 29 no.4 (2004): 365-392.

Ding, Lei, Janneke Ratcliffe, Michael A. Stegman, and Roberto G. Quercia. "Neighborhood Patterns of High-priced Lending: The Case of Atlanta." *Journal of Affordable Housing and Community Development Law* 17 n.3 (2008): 193-218.

Fishbein, Allan and Harold Bunce. "Subprime Market Growth and Predatory Lending." In Susan M. Wachter and R. Leo Penne, eds. *Housing Policy in the New Millenium*. Washington DC: U.S. Department of Housing and Urban Development, 2000.

Gunther, Jeffrey, Kelly Klemme, and Kenneth J. Robinson. "Redlining or Red Herring." *Southwest Economy: Journal of the Federal Reserve Bank of Dallas* (May/June1999): 8-13.

Haag, Susan W. "Community Reinvestment and Cities: A Literature Review of CRA's Impact and Future." Discussion Paper prepared for the Brookings Institution, 2000.

Hendershott, Patric W., William C. LaFayette, and Donald R. Haurin. "Debt Usage and Mortgage Choice: The FHA-Conventional Decision." *Journal of Urban Economics* 41 no.2 (1997): 202-217.

Immergluck, Dan. *Credit to the Community: Community Reinvestment and Fair Lending Policy in the United States*. Armonk, NY: M.E. Sharpe Inc., 2004.

Joint Center for Housing Studies. "The 25th Anniversary of the Community Reinvestment Act: Access to Capital in an Evolving Financial Services System." Report of the Joint Center for Housing Studies to the Ford Foundation, March 2002.

LaCour-Little, Michael. "The Home Purchase Mortgage Preferences of Low- and Moderate-Income Households." *Real Estate Economics* 35 no.3 (2007): 265-290.

Listokin, David and Elvin Wyly. "Making New Mortgage Markets: Case Studies of Institutions, Home Buyers, and Communities." *Housing Policy Debate* 11 no.3 (2000): 575-644.

Litan, Robert E., Nicolas P. Retsinas, Eric S. Belsky, Gary Fauth, Maureen Kennedy, and Paul Leonard. "The Community Reinvestment Act After Financial Modernization: A Final Report." Report to the U.S. Department of Housing and Urban Development, January 2001.

Pennington-Cross, Anthony and Joseph Nichols. "Credit History and the FHA-Conventional Choice." *Real Estate Economics* 28 no.2 (2000): 307-336.

Pennington-Cross, Anthony, Anthony Yezer, and Joseph Nichols. "Credit Risk and Mortgage Lending: Who Uses Subprime and Why?" Research Institute for Housing America Working Paper #00-03, September 2000.

Quercia, Roberto G., George W. McCarthy, and Susan M. Wachter. "The Impacts of Affordable Lending Efforts on Homeownership Rates." *Journal of Housing Economics* 12 no.1 (2003): 29-59.

Quercia, Roberto G., Michael A. Stegman, Walter R. Davis, and Eric Stein. "Performance of Community Reinvestment Loans: Implications for Secondary Market Purchases." In Nicolas P. Retsinas and Eric S. Belsky. *Low-Income Homeownership: Examining the Unexamined Goal*. Washington DC: Brookings Institution Press, 2002.

Schwartz, Alex. "Bank Lending to Minority and Low-Income Households and Neighborhoods: Do Community Reinvestment Agreements Make a Difference?" *Journal of Urban Affairs* 20 no.3 (1998): 269-301.

Schwartx, Alex. "From Confrontation to Collaboration? Banks, Community Groups, and the Implementation of Community Reinvestment Agreements." *Housing Policy Debate* 9 no.3 (1998): 631-662.

Temkin, Kenneth, Roberto G. Quercia, and George C. Galster. "The Impact of Secondary Mortgage Market Guidelines on Affordable and Fair Lending: A Reconnaissance from the Front Lines." *Review of Black Political Economy* 28 no.2 (2001): 29-52.

Tables and Figures

Table 1: Borrower and loan characteristics in CAP, 1998-2006.

Variable:	Mean
Borrower Characteristics:	
Annual household income	$33,645
Ratio income to AMI	.62
Black borrower or co-borrower	.18
Hispanic borrower or co-borrower	.15
Minority borrower or co-borrower	.39
Loan Characteristics:	
Origination loan balance	$90,252
Interest rate	.072
Front-end ratio: mortgage payment to monthly income	.28
Back-end ratio: debt to monthly income	.37
Loan-to-value ratio 100+	.24
Loan-to-value ratio 97-99	.32
Loan-to-value ratio 90-96	.29
Loan-to-value ratio 80-89	.08
Loan-to-value ratio <80	.06
Origination credit score <580	.04
Origination credit score 580-619	.11
Origination credit score 620-659	.22
Origination credit score 660-719	.33
Origination credit score 720+	.30
N	31,472

Figure 1: FRM, ARM, and CAP interest rates across time.

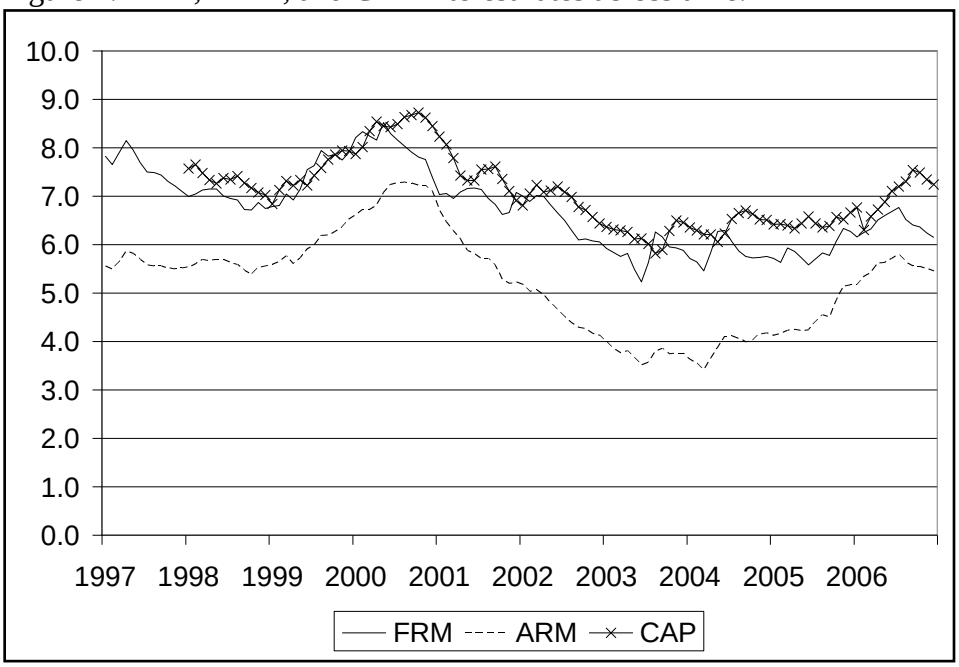
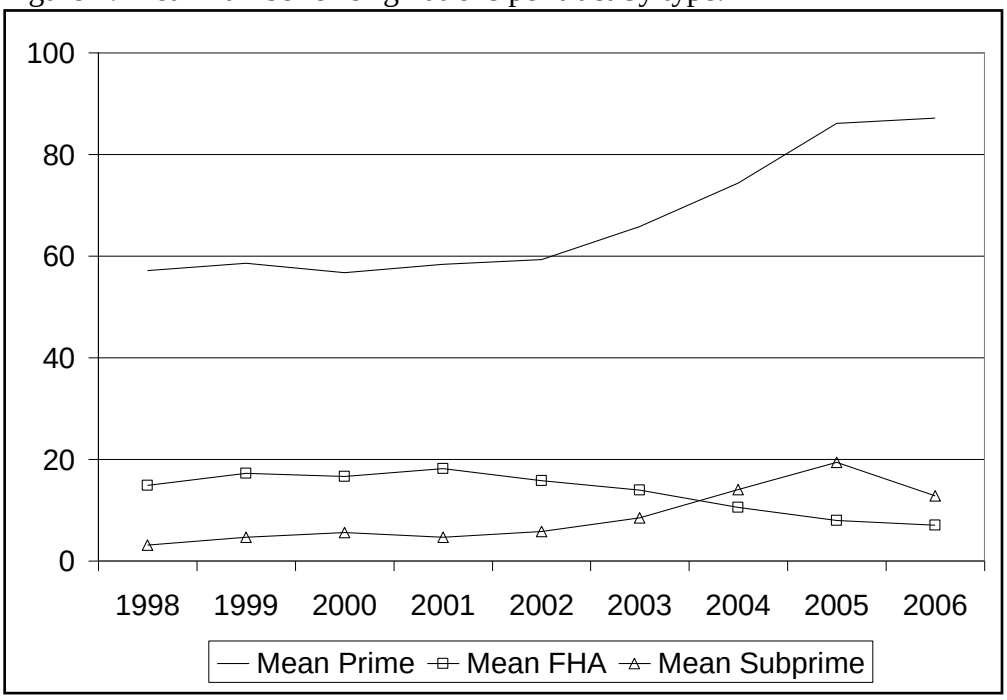


Table 2: 2000 Census characteristics for CAP vs. non-CAP census tracts.

	CAP Tracts	Non-CAP Tracts
Variable:	Mean	Mean
Total population	4,940	4,174
Median houshold income	$40,056	$43,261
Ownership rate	66.4	65.6
Median home value	$99,394	$134,189
Percent in poverty	13.0	13.7
Percent unemployed[a]	6.1	6.5
Percent with high school degree[b]	78.7	79.0
Percent with 4 year college degree[b]	20.2	22.9
Percent Hispanic	7.2	10.5
Percent black	19.3	12.9
Percent minority	30.7	29.1
N	7,691	41,103

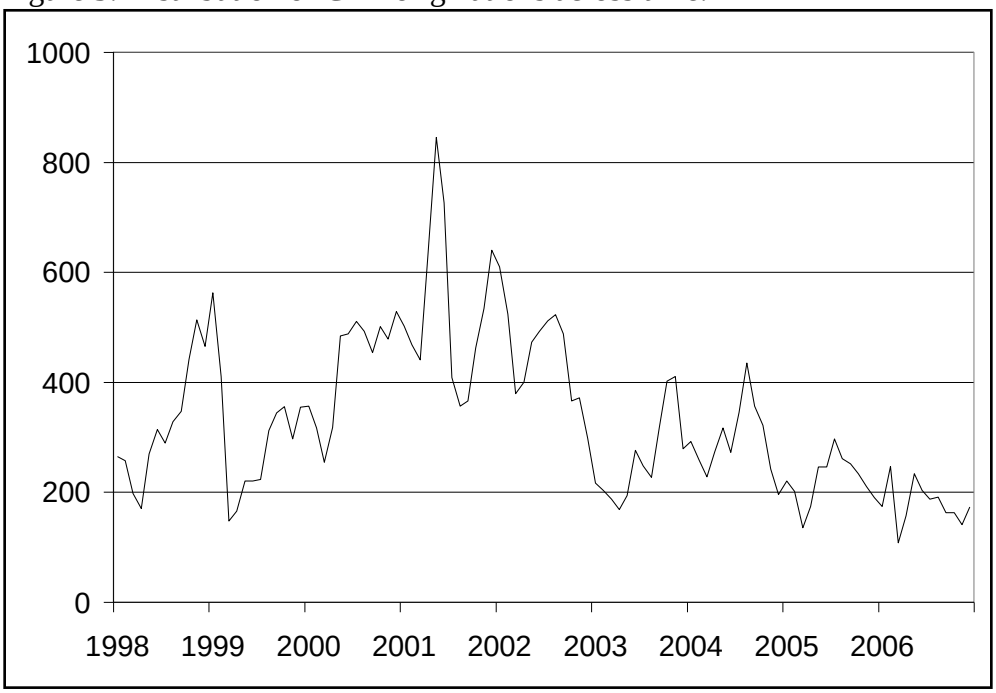
[a] Of individuals age 16 or older.
[b] Of individuals age 25 or older.

Figure 2: Mean number of originations per tract by type.



N=69,219 (7,691 observations per year).

Figure 3: Distribution of CAP originations across time.



N=35,925.

Table 3: Estimated impacts of CAP lending on the number and share of prime, subprime, and FHA originations.

	Subprime Share		FHA Share		# Prime		# Subprime		# FHA	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
# CAP loans	-.002**	(.0004)	-.006**	(.0005)	1.057**	(.157)	-.147**	(.044)	.074	(.053)
# Prime loans							.151**	(.001)	.032**	(.001)
# Subprime loans					1.941**	(.012)			-.295**	(.005)
# FHA loans					.285**	(.012)	-.205**	(.003)		
(1998 omitted)										
Year 1999	.022**	(.0012)	.009**	(.0015)	-2.101**	(.526)	1.778**	(.146)	2.792**	(.176)
Year 2000	.038**	(.0013)	.002	(.0015)	-5.882**	(.526)	2.933**	(.146)	2.480**	(.176)
Year 2001	.019**	(.0012)	.018**	(.0015)	-2.727**	(.526)	2.023**	(.147)	3.706**	(.176)
Year 2002	.035**	(.0012)	-.010**	(.0015)	-3.311**	(.525)	2.541**	(.146)	1.597**	(.176)
Year 2003	.058**	(.0012)	-.048**	(.0015)	-1.360**	(.528)	3.850**	(.146)	.375*	(.177)
Year 2004	.097**	(.0012)	-.092**	(.0015)	-2.714**	(.540)	7.453**	(.148)	-1.632**	(.181)
Year 2005	.120**	(.0012)	-.127**	(.0015)	-.541	(.560)	10.477**	(.150)	-3.094**	(.187)
Year 2006	.072**	(.0013)	-.132**	(.0015)	13.634**	(.541)	3.503**	(.151)	-5.966**	(.180)
Constant	.059**	(.0009)	.212**	(.0011)	46.429**	(.420)	-2.397**	(.128)	13.946**	(.143)
Tract fixed effects[a]	--**		--**		--**		--**		--**	

[a] The joint significance of the tract fixed effects is determined by an F-statistic that tests whether all of the effects equal zero. No coefficient or standard error is reported for this test, as it reflects the joint significance of multiple fixed effects.
N=69,219 observations (7,691 tracts)
*p<.05; **p<.01

Table 4: Estimated impacts of CAP by time period.

	# Prime		# Subprime		# FHA	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
Panel 1: 1998-2001						
# CAP loans	1.047**	(.124)	.020	(.023)	-.250**	(.065)
# Prime loans			.020**	(.001)	.125**	(.003)
# Subprime loans	0.575**	(.035)			.394**	(.018)
# FHA loans	0.460**	(.012)	.050**	(.002)		
(1998 omitted)						
Year 1999	-.441	(.277)	1.373**	(.051)	1.591**	(.144)
Year 2000	-2.773**	(.286)	2.415**	(.051)	.844**	(.149)
Year 2001	-1.218**	(.279)	1.334**	(.051)	2.566**	(.144)
Constant	48.088**	(.278)	1.234**	(.078)	6.624**	(.215)
Tract fixed effects[a]	--**		--**		--**	
Panel 2: 2002-2006						
# CAP loans	.686*	(.279)	-.423**	(.082)	.208**	(.078)
# Prime loans			.115**	(.002)	-.017**	(.002)
# Subprime loans	1.338**	(.018)			-.281**	(.005)
# FHA loans	-0.217**	(.020)	-.311**	(.006)		
(2002 omitted)						
Year 2003	2.616**	(.529)	1.317**	(.155)	-.927**	(.148)
Year 2004	2.956**	(.546)	4.882**	(.158)	-2.603**	(.152)
Year 2005	6.995**	(.578)	8.024**	(.164)	-3.560**	(.160)
Year 2006	16.709**	(.556)	.983**	(.166)	-6.285**	(.153)
Constant	54.663**	(.535)	4.033**	(.180)	18.302**	(.138)
Tract fixed effects[a]	--**		--**		--**	

[a] The joint significance of the tract fixed effects is determined by an F-statistic that tests whether all of the effects equal zero. No coefficient or standard error is reported for this test, as it reflects the joint significance of multiple fixed effects.
N=30,764 observations in Panel 1 (7,691 tracts).
N=38,455 observations in Panel 2 (7,691 tracts).
*p<.05; **p<.01

Table 5: Estimated impact of CAP on high-cost lending (2004-2006).

	# Low-Cost		# High-Cost		# FHA	
	Coef.	S.E.	Coef.	S.E.	Coef.	S.E.
# CAP loans	1.017**	(.362)	-.707**	(.218)	.122	(.080)
# Low-cost loans			.101**	(.005)	-.024**	(.002)
# High-cost loans	.278**	(.013)			-.121**	(.003)
# FHA loans	-.489**	(.036)	-.901**	(.021)		
(2004 omitted)						
Year 2005	-3.541**	(.470)	14.541**	(.258)	-.512**	(.104)
Year 2006	-5.532**	(.461)	11.481**	(.263)	-1.745**	(.101)
Constant	63.127**	(.586)	18.729**	(.443)	13.875**	(.130)
Tract Fixed Effects[a]	--**		--**		--**	

[a] The joint significance of the tract fixed effects is determined by an F-statistic that tests whether all of the effects equal zero. No coefficient or standard error is reported for this test, as it reflects the joint significance of multiple fixed effects.
N=23,073 observations (7,691 tracts).
*p<.05; **p<.01